

MUS421–571.1 Electroacoustic Music Composition

Kirsten Volness – 13 Feb 2018

Early Electronic Instruments

- Automata (1738) Jacque Vaucanson
 - Claveçin électrique (1761) Jean-Baptiste Delaborde
- Telharmonium (1906) Thaddeus Cahill
 - Relation to telecommunications
 - Lee De Forest (1909) Audion (vacuum tube)
- Theremin (1920) Leon Theremin
 - Performed, not programmed
- Ondes Martenot (1928) Maurice Martenot
 - More timbral control
 - 1930 Philadelphia Orchestra; 1937 Paris World's Fair
- Similar conception of music using different sounds

Sine Wave

Created with oscillator

 DC (direct current) from power supply is converted to AC (alternating current) which creates the wave, the frequency of which can be controlled by adjusting the voltage

More power, higher frequency; less power, lower frequency

Early Recording

- Phonautograph (1857) Leon Scott
- Wax cylinders / phonograph / gramophone (1877)
- Loudspeaker (1877); Moving-coil loudspeaker (1898)
- Magnetic Tape (1928) Fritz Fleumer

Musical Developments

- Textural composition
 - Schoenberg's "Farben" from Five Pieces for Orchestra, Op. 16)
- Words as sound, without meaning
 - Dada
- Noise as music
 - Futurism

- (Russolo - intonarumori, Antheil - Ballet Méchanique)

Marcel Duchamp – Fountain (1917)



Editing Techniques

- Overdubbing re-recording multiple takes on the same tape
- Reverse
- Splicing
- Layering
 - Foreground / middle ground / background
 - Dynamic texture
 - Melody / perception of time

Analog vs. Digital



Each digitized sample of audio is assigned a value that corresponds to the amplitude of the analog wave.

Sample rate = how many measurements of amplitude are taken each second 44, 100 (44.1 kHz) for CD audio; 48, 000 (48 kHz) for video sync

Bit Depth (or Bit Rate)



- Bit Depth = how specific a value is captured with each sample.
- The higher the bit depth, the more fine the scale of measurement, thus the more closely the digital wave approximates the analog wave

Time Compression and Expansion

- Excessive time expansion will create granular "artifacts" (a gritty sound)
 - The sample resolution is not high enough to fill in the missing data to reproduce the sound exactly
 - This can be effective for creating texture when layered beneath another cleaner copy of the sound

Audio Examples

- Mazzy Star Roseblood
- Queen Bohemian Rhapsody
- Queen Another One Bites the Dust
- Chemical Brothers The Boxer
- Hubert Howe 19-Tone Clusters
- Aphex Twin Lichen
- DJ Spooky Dementia Absentia

